

SANITARY SEWER STUDY

FOR

**THE RELOCATION OF OLD VIRGINIA ROAD
SANITARY SEWER MAIN**

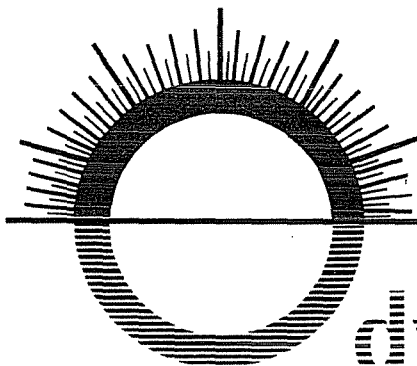
**DAMONTE RANCH DISTRIBUTION CENTER
WASHOE COUNTY, NEVADA**

FOR

**SCI DEVELOPMENT SERVICES INCORPORATED
650 VISTA BOULEVARD, STE. 300
SPARKS, NEVADA 89434**

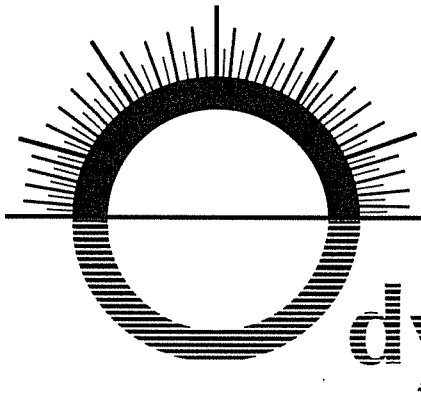
PREPARED BY

2105 Capurro Way Suite F, Sparks, NV 89431
(702) 359-3303 Fax (702) 359-3329



dyssey ENGINEERING
INCORPORATED

SEPTEMBER, 1997



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(702) 359-3303 Fax (702) 359-3329

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INCORPORATED

**SANITARY SEWER STUDY FOR
RELOCATION OF OLD VIRGINIA ROAD
SANITARY SEWER MAIN,
DAMONTE RANCH DISTRIBUTION CENTER
WASHOE COUNTY, NEVADA**

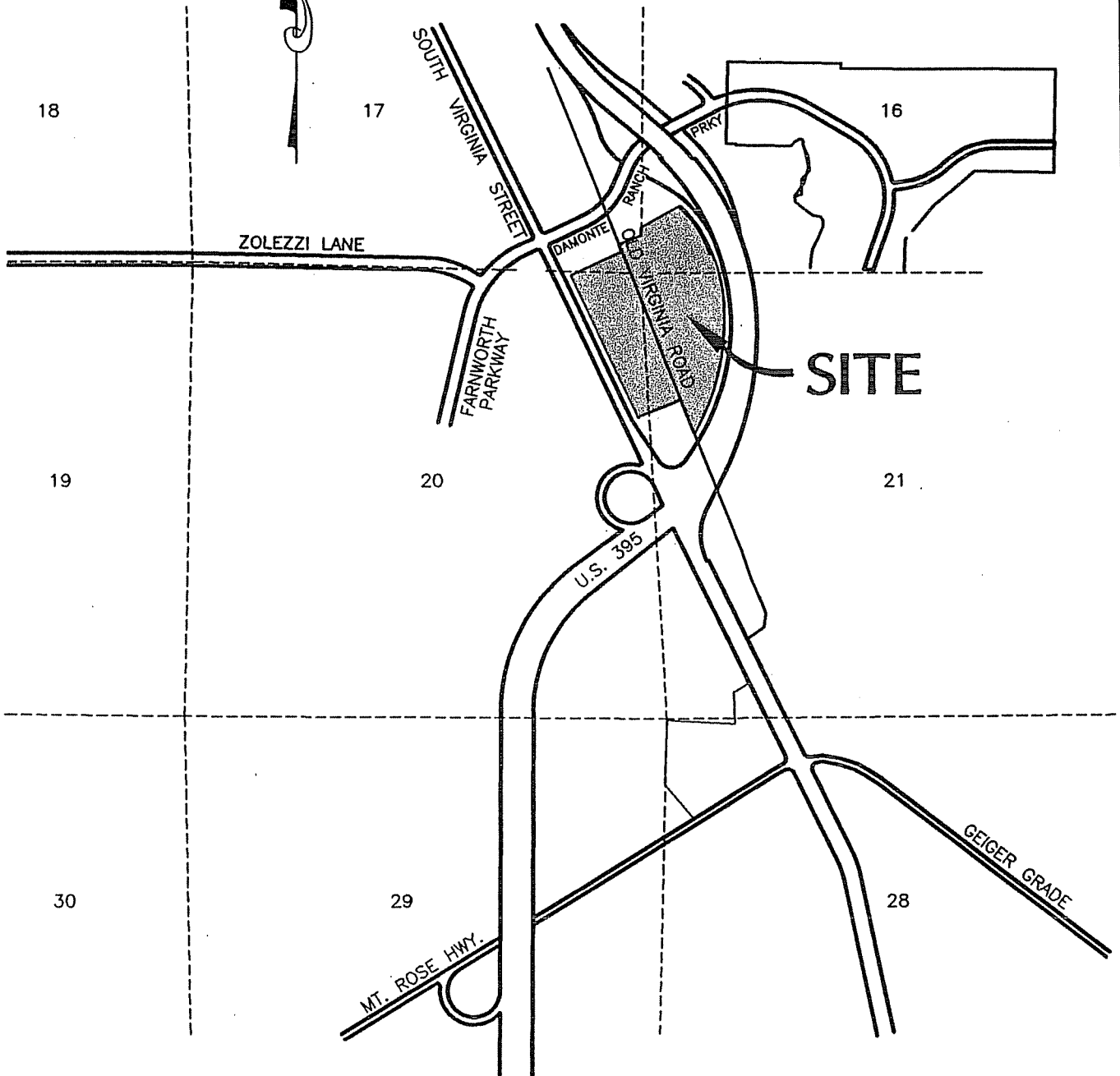
INTRODUCTION

The following report analyses the minimum downstream pipe diameters required to relocate an existing 12" diameter sewer main located in Old Virginia Road.

The existing 12" diameter main begins approximately 200 feet south of the new 395 South Interchange with South Virginia Street. The main extends approximately 540 feet east across South Virginia Street into Old Virginia Road. From this point, the main extends along Old Virginia Road approximately 4,250 feet north and connects into an existing 24" diameter main at the intersection of Zolezzi Lane with Old Virginia Road (Reference Figure 1).

With development of the Damonte Ranch Distribution Center, the developer is proposing to realign approximately 3,100 feet of Old Virginia Road. This realignment will shift the existing 12" diameter main approximately 180 feet east of it's original horizontal alignment and approximately 10 feet below it's existing vertical alignment. This vertical shift will not allow reconnection back into the existing 12" diameter main, causing the realigned configuration as shown on Figure 2.

The proposed realignment will begin approximately 2,600 feet south of the intersection of Zolezzi Lane and Old Virginia Road. From this point a new 12" diameter main will travel north along the proposed alignment of Old Virginia Road for approximately 1,450 feet (Node No. 2). At this point, the proposed main will leave the right-of-way of Old Virginia Road, and will travel approximately 3,050 feet through the travel lanes and parking lots of the proposed Damonte Ranch Distribution Center and will connect into a proposed interceptor (Node No. 4) which will be built with Damonte Ranch Parkway (new Zolezzi Lane) (Reference Figure 2).



VICINITY MAP

With reference to the Civil Improvement Plans entitled "Damonte Ranch Parkway - Roadway Improvements" dated February, 1997, prepared by Odyssey Engineering Incorporated, the proposed point of connection for the realigned Old Virginia Road sewer main will be at S.S.M.H. No. 1 - Sta. "Z" 16+26.53 (Node No. 4). A 12" diameter main is proposed from Sta. "Z" 16+26.53 to Sta. "Z" 20+32.39. A 15" diameter main is proposed from Sta. "Z" 20+32.39 to Sta. "Z" 32+95.49 - S.S.M.H. No. 5 (End of Sewer Study) as shown on Figure 3. From this point the 15" diameter main will continue east along the Damonte Ranch Parkway roadway alignment and will connect into a proposed 30" diameter main which ultimately connects into the existing 30" diameter interceptor at the southeast corner of the Double Diamond Ranch.

COLLECTION SYSTEM CAPACITY REQUIREMENTS

In order to determine the required sizes for the collection system, the following design criteria were used:

1. The average daily flow from single family residential unit is assumed to be 350 gallons per day per unit (per Washoe County Utility Division - Design Standards for Wastewater Systems).
2. The average daily flow from the Damonte Ranch Distribution Center was determined by using fixture units (based on previously constructed buildings).
3. The average daily flow from the remaining unknown commercial uses are assumed to be 10,000 gallons per acre per day.
4. The design depth of flow in the sanitary sewer pipes will not be permitted to exceed $0.8D$, where D is the nominal diameter of the pipe.
5. This analysis stops at Node No. 5 (Whites Creek boundary) since all remaining property east of 395 and west of Steamboat Creek was previously analyzed by Washoe County Utility Division.
6. A Manning Friction Value of $n = 0.012$ was used.

The proposed sewage collection system is broken down into 5 nodes or branch systems, as shown on the Sewage Collection System Preliminary Layout Plan. The service area for each node contains an area number, an area, and an existing/proposed land use. Figure 3 shows the overall node configuration as well as capacity requirements for each node. The 8.32 M.G.D. contribution value was provided to us by Washoe County Utility Division and will need to be added to the contribution from the realigned sewer value of 1.62 M.G.D. bringing the design flow total to 9.94 M.G.D.

CONCLUSION

The highest calculated flow will be at the point of connection located at the southeast corner of the Double Diamond Ranch. This calculated flow is 9.94 M.G.D. The free flow capacity of a 30 inch diameter sanitary sewer pipe with a Manning's Friction Value of $n = 0.012$, constructed at a slope of 0.0030 Ft./Ft., and with a flow depth of 0.8D is approximately 15.37 M.G.D. Therefore, a 30 inch diameter main will be adequate for the Old Virginia Road sewer relocation and the 8.32 M.G.D. contribution from future developments to the south.

EXHIBITS

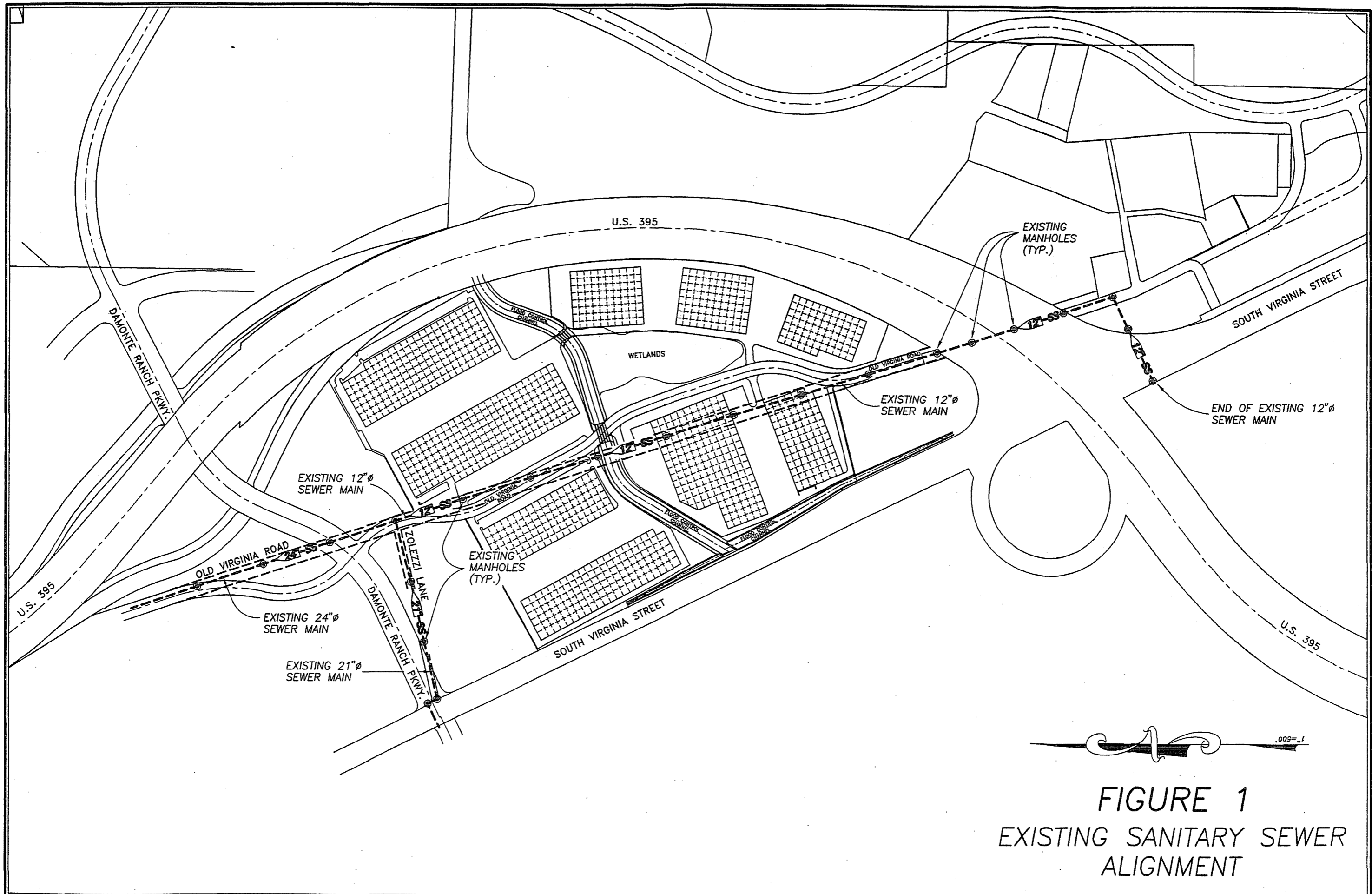


FIGURE 1
 EXISTING SANITARY SEWER
 ALIGNMENT

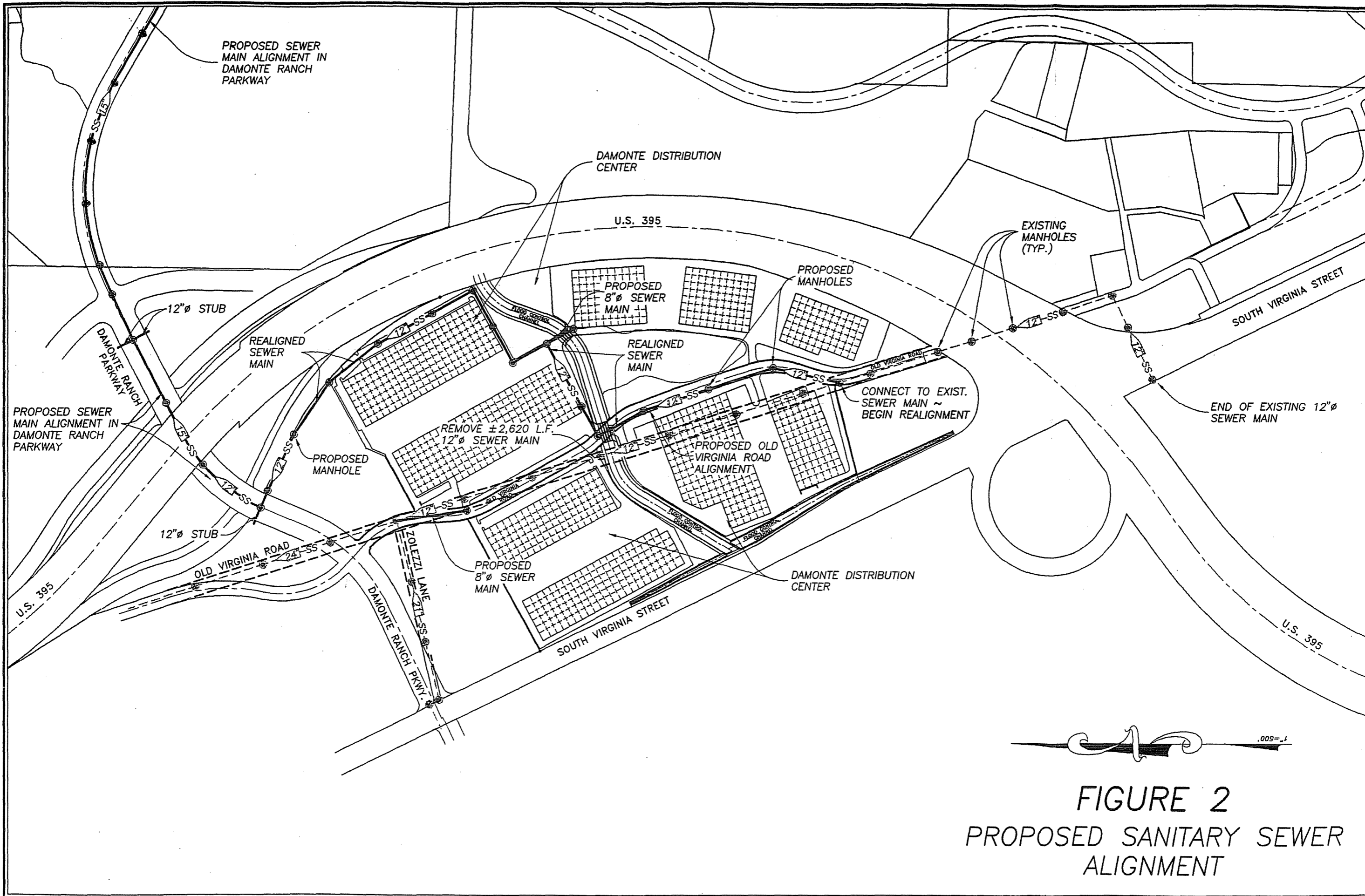


FIGURE 2
PROPOSED SANITARY SEWER
ALIGNMENT